Today's Agenda

- Introduction
- Energy Usage in Data Centers
- Testing and Implementing Metrics
  - How do we define?
  - Where are measurements taken?
  - Does ratio work for all data centers?
  - Are there sources of measured data available?
  - How can additional data be gathered?
- Next Steps

Implementing a High Level Performance Metric

- **“IT load” and “total load”**
  - How do we define?
    - Predictable and intuitive
    - Non – geocentric
    - Repeatedly measurable
    - Generic
      - Equipment types
      - Technology
      - Vendors
      - Users
    - Similar to current EPA benchmarks
    - Timeframe to develop: Less than One Year

Implementing a High Level Performance Metric

- **"IT load" and "total load"**
  - Where are measurements taken with respect to IT equipment, power supplies, UPS, etc.?
    - What is THE significant ratio with large amount of "Data Centers" commingled with office load
    - Is the "reliability" of the supply a factor in increasing or varying the scale?
    - Is it important for location (economizer effects)?
    - How can "anybody" do it?
    - What about new Technology? (DC Power, Med voltage UPS)
    - How is it repeatable on a periodic basis without risk / high cost?

Implementing a High Level Performance Metric

- **“IT load” and “total load”**

  Test for a standard

  – Does the ratio work for all data centers of any size range, mission applicability, infrastructure redundancy, location, supply voltage, energy density or other use factors?

Implementing a High Level Performance Metric

- **Increasingly strident calls for Green in the data center**
- **Focused reduction of Op-x (along with reduction of Cap-x)**
- **How do we show progress and opportunities to delivery power efficiency**
- **Face the woeful reality of virtualization**
  - **A 50% reduction in the number of servers reduces power by only 25%**
  - **The promise of virtualization to address capacity challenges will fall far short of expectation**
  - **Increasing IT complexity and decreasing resiliency**
  - **Virtualization technologies disintermediate the hardware and business process**
- **Create increasingly complex data center fail-over operations**
- **Impact of outage will be far more pervasive and less predictable**

Implementing a High Level Performance Metric

- **"IT load" and "total load"**
  - Are there sources of measured data available for analysis?
    - Repeatable, scientific, and non-invasive
    - How can vendors help with instrumentation?
    - This is not a LEED process as it will be continuous rather than a one-time event
  - Reliability is the priority, but now efficiency is a close second…

    …or is it still on the back burner?

Implementing a High Level Performance Metric

- **"IT load" and "total load"**
  - How can additional data be gathered to development performance metrics?
    - Coordination of ICE Teams
    - Vendor compliance to a "standard"
    - Industry wide measurement tool
  - Development of an EPA benchmark for Data Center efficiency rating
    - Any rate above a "Green threshold" is by definition ***GREEN***

Today's Agenda

- Introduction
- Energy Usage in Data Centers
- Testing and Implementing Metrics
- Next Steps
  - EPA ENERGY STAR Focus
  - DOE Save Energy Now

Next Steps

LEARN MORE AT energystar.gov

- EPA ENERGY STAR Focus
  - Formal launch by end of 2007
  - Build off of today's discussion
  - Create actionable metrics for data center end users
    - Incorporate metrics with ENERGY STAR Tools
    - Collaborate with industry to refine and improve metrics

Next Steps

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- DOE Save Energy Now
- Take consensus metrics and use within pilot energy assessments
- Provide feedback on usefulness of metrics
- Incorporate metrics within DOE tools
- Incorporate metrics within DOE training
- Collaborate with industry on improving tools, measurement protocols, metrics and training